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3.1 AIR INDICATORS

During a 2-hour conference call on November 7, 2005, three peer reviewers (see Appendix 3A) critically reviewed three draft indicators that EPA proposed to include in the air chapter of the ROE Technical Document. Two draft indicators were revised versions of regional indicators the peer reviewers had evaluated in July 2005; EPA developed the third proposed indicator in response to recommendations the peer reviewers had made during the July review. The charge for the teleconference review is provided in Appendix 3B-1. Preliminary comments, developed individually by reviewers prior to the teleconference, are provided in Appendix 3C-1.

This chapter summarizes reviewer discussions and presents consensus conclusions and recommendations for these three air indicators. Regarding modifications that reviewers designated as "suggested," the peer reviewers emphasized that these revisions are all important for EPA's consideration and should not be viewed as entirely optional.

The table below shows the reviewers' overall recommendations for these three indicators.

Table 3.1-1. Peer Reviewer Recommendations for Air Indicators

Indicators	Include with Suggested Modifications	Don't Include Unless Critical Modifications Are Made	Don't Include
Ambient nitrogen dioxide (NO_2) concentrations	✔		
Ambient concentrations of manganese in EPA Region 5		✔	
Ozone and Particulate Matter (PM) Concentrations for U.S. Counties in the U.S./Mexico Border Region (EPA Regions 6 and 9)		✔	

3.1.1 AMBIENT NITROGEN DIOXIDE (NO_2) CONCENTRATIONS

Consensus Statements	
Overall recommendation	**Include.**
Critical modifications	None.
Suggested modifications	• The "indicator limitations" section should more prominently acknowledge the potential interferences in NO_2 measurements. The reviewers noted that other compounds not mentioned in the report, like peroxyacetylnitrate (PAN) and nitric acid, can interfere with the measurements. Further, the limitations can note that measurement devices with ultraviolet photolytic converters are far less prone to interference than devices with heated surfaces (or catalysts) upstream of the chemiluminescence detector. • Presenting some information in the text on NO_x emissions trends would provide greater context for interpreting the trend lines for NO_2 concentrations. • The first paragraph should more accurately describe what is meant by NO_x (nitrogen oxide and nitrogen dioxide), as compared to total reactive nitrogen, or NO_y (nitrogen oxide, nitrogen dioxide, nitric acid, peroxyacetyl nitrate, and others). • Different colors or line styles should be used in Figure 355-2 such that readers can easily distinguish the different trend lines. One reviewer preferred using maps with 10 separate graphs depicting the individual regional trend lines, rather than presenting all of the trend lines on a single graph. • EPA should correct an inconsistency in the response to question T4Q1 on the "metadata form." The response refers to 9 years of measurements, while Figure 355-1 presents 25 years of measurements.

Brief Summary: The peer reviewers agreed that the ambient NO_2 concentration indicator provides important insight on the overall question regarding outdoor air quality and commended EPA for developing this indicator based on recommendations made during the July peer review meeting.

3.1.2 AMBIENT CONCENTRATIONS OF MANGANESE COMPOUNDS IN EPA REGION 5

Consensus Statements	
Overall recommendation	**Do not include unless critical modifications are made.**
Critical modifications	• Additional explanatory text should place the regional issue into a broader national context. While the second paragraph of the indicator now explains why manganese compounds are particularly important to EPA Region 5, the extent to which airborne manganese is (or should be) of concern nationwide is unclear. One suggestion was to briefly compare the Region 5 data to current measurements across the country, using nationwide monitoring data (e.g., EPA's $PM_{2.5}$ Speciation Trends Network, National Air Toxics Trends Sites, Inter-Agency Monitoring of Protected Visual Environments) or by quoting relevant data from other EPA reports. • The indicator needs to describe why total suspended particulate (TSP) measurements were selected for this metric and acknowledge the uncertainties and limitations that are introduced as a result. One reviewer noted that TSP measurements, as compared to PM_{10} or $PM_{2.5}$ measurements, are relatively poor for characterizing inhalation exposures. Further, use of TSP data complicates efforts to compare Region 5's trends to those being tracked with PM_{10} or $PM_{2.5}$ data. The indicator should clearly explain why TSP data are being used (e.g.: Is it because a more complete data set is available for TSP? Is it because this size fraction continues to be monitored and will allow for tracking trends into the future? Are there other reasons?). • The reviewers supported EPA's decision to include information on the Reference Concentration (RfC), but they listed several ways this information could be better communicated. The text should more clearly explain that the RfC is used for evaluating *chronic*, rather than acute, exposures. Consequently, the indicator appropriately compares long-term average concentrations (as opposed to maximum concentrations) to the RfC. Under "What the Data Show," the text should clearly state that *annual* average concentrations were above the RfC, rather than saying that average concentrations were. The peer reviewers questioned the appropriateness of comparing TSP measurements to RfCs, and wondered if data for respirable particle size fractions are better suited for this comparison. • The peer reviewers were not convinced that a 5-year data set is a long enough to establish trends. Accordingly, they questioned what the reported decrease in concentrations (14.7%) represents: Does it reflect decreases in emissions, whether from sources in the U.S. or in Canada? Or might it simply reflect fluctuating meteorological conditions? Given this concern, the peer reviewers recommended that Figure 200R-2 not display changes from one year to the next. Rather, this figure should present the distribution of 5-year average concentrations. The text can describe this distribution as baseline conditions, against which future trends will be compared.

Suggested modifications	• Figure 200R-1 should use box plots that include the minima, maxima, and the percentiles. For both figures, EPA should avoid using colors (yellow) that are difficult to read. • The draft indicator presents information on how ambient concentrations changed between 2000 and 2004, but does not provide any similar context on emissions trends. The peer reviewers suggested that the text describe changes in estimated emissions during this time, whether from industrial sources in Region 5 (using Toxic Release Inventory data) or from mobile sources in Canada (due to that nation's use of methylcyclopentadienyl manganese tricarbonyl as a fuel additive).

Brief Summary: The peer reviewers agreed that the current draft indicator explains why ambient concentrations of manganese compounds are an important air quality issue for EPA Region 5. While they commended EPA for addressing many of the concerns expressed during the July peer review meeting, the peer reviewers noted that several critical modifications must be made before this indicator is included in ROE.

3.1.3 OZONE AND PARTICULATE MATTER (PM) CONCENTRATIONS FOR U.S. COUNTIES IN THE U.S./MEXICO BORDER REGION (EPA REGIONS 6 AND 9)

Consensus Statements	
Overall recommendation	**Do not include unless critical modifications are made.**
Critical modifications	• The peer reviewers were concerned that readers can easily misinterpret the reported trends due to lack of context on specific border issues that affect air quality. For instance, the peer reviewers found Figure 296R-1b misleading because it shows considerably higher PM_{10} concentrations in the border area compared to the national average. Readers might infer from this difference that the higher PM_{10} levels are caused by proximity to the border (and industries in Mexico), when a more logical explanation for this difference might be that the border region is more arid and dusty than the nation as a whole. Revisions to the text are needed to address this issue. Specifically, the peer reviewers recommended that EPA delete or greatly condense the second and third paragraphs of this indicator, because nearly identical text already appears in other ROE indicators on ozone and PM ambient concentrations. Instead, these paragraphs should present specific caveats about how the border data should—and should not—be interpreted. Revisions to the figures were also recommended to present appropriate contextual information. For example, the peer reviewers recommended that data from the border region be compared (1) to the national trend for overall perspective and (2) to some other metric that is more indicative of an arid climate, like the corresponding average values for all of Region 6 and all of Region 9. • The peer reviewers found several aspects of the figures to be confusing and potentially misleading. First, the figures introduce the term "design value," which is not defined elsewhere. The peer reviewers recommended either defining the term or using a different term altogether, such as those used in the other ambient concentration indicators (e.g., seasonally weighted annual average concentrations for PM data). Second, the peer reviewers recommended that the indicator specify where the monitoring locations, whether in the text or using a map, thus allowing a more meaningful interpretation of the figures. Third, the peer reviewers were confused by use of two different trends lines for the border region: one for "all border sites" and the other for a subset of these border sites. The true meaning of these different lines was clear only after an EPA observer was asked to clarify what they represent. The reviewers were not convinced that presenting separate trend lines for the border region in each figure contributes significantly to a greater scientific understanding of air quality issues along the border. In one particular case (see Figure 296R-2c), this presentation approach raised many questions because the two "border" trend lines differed both in magnitude and direction. Thus, the peer reviewers recommended that EPA consider either using a single line for the border region in each figure or revising the text such that the distinction between the lines is clear and comprehensible to the reader.

Critical modifications	• Agreeing with one of the "indicator limitations" that the available monitoring data do not have adequate spatial coverage to represent the entire border region, the peer reviewers recommended EPA consider two additional data sources. First, one reviewer recommended that EPA consider using relevant PM_{10} and $PM_{2.5}$ data from the Inter-Agency Monitoring of Protected Visual Environments (IMPROVE) network, whether to include among border sites or comparison sites. Second, the peer reviewers recommended that EPA include data collected on the other side of the border in Mexico, to the extent possible. Any concerns regarding comparability and quality of data from Mexico could be addressed in the "indicator limitations" section.
Suggested modifications	• One peer reviewer questioned the statement that "…these counties show a *downward* trend in ozone, $PM_{2.5}$, and PM_{10} similar to the trends in the rest of the U.S." They noted that a clear downward trend is not readily apparent from all figures. • One peer reviewer noted that the indicator lacks discussion of the broader motivation for evaluating border issues, such as commitments made in the North American Free Trade Agreement and targets in state implementation plans.

Brief Summary: The peer reviewers noted that the current draft indicator provides better justification for including this indicator in ROE and addresses some concerns that were raised during the July peer review meeting. However, they also noted that the current draft leaves many questions unanswered, which could provide a misleading account of border issues. The peer reviewers identified several critical modifications that must be made if EPA intends to include this indicator in ROE.